

## History of Elo

*Adapted from Elo's Touching Moments.*

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*Special contributions by Connie Smith and Betty Colwell.*

*Photography by Chuck Bales and Richard Gardner.*

Elographics, Inc. was founded by ten stockholders in March, 1971, to produce Graphical Data Digitizers for use in research and industrial applications, with the principal being Dr. Sam Hurst. He was on leave from the Oak Ridge National Laboratory to teach at the University of Kentucky for two years, where he was faced with a need to read a huge stack of strip chart data. It would have taken two graduate students approximately two months to do the task. He started thinking of a way to read the charts, and during the process, the "Elograph" (electronic graphics) coordinate measuring system and Elographics the company were born. The University of Kentucky Research Foundation applied for and was granted a patent on the Elograph. The Foundation granted an exclusive license to Elographics.



*Dr. G. S. "Sam" Hurst (left), founder of Elographics, Inc. The Elograph was selected by Industrial Research as one of the 100 Most Significant New Technical Products of the Year 1973.*

In 1971, after returning to Oak Ridge, Dr. Hurst gathered nine friends from various areas of expertise to start a company to refine, manufacture and sell this new product. At this point Elographics truly began as a basement business. All work was done from three different basements; sensors in one, electronics in another, and cabinets in still another. The office was located in the home where the sensors were being built before moving to Four Oaks Center in February of 1972. The parts of the product were still being produced in basements at night and on weekends and brought to Four Oaks where they were assembled and shipped.

Elographics focused on research and scientific markets and produced products that met the specific needs of these markets. These needs included completely self-contained units with adjustable scale factors, decimal readouts, and interfaces to computers and many calculators. The digitizer products were used worldwide in a variety of applications including research, medicine and quality control.



*Elograph-Electronic Graphing Device (walnut cabinet)*

As early as the 1970's Elographics' management focused on technological improvements of the products and set out to convince the world everyone needed to purchase one of these units. Ted Wilmart, one of the first sales representatives, sold over 60 Elographs at a price of \$8000 per unit to a carpet company in Dalton, Georgia, who used the product to measure contaminated particle sizes in carpet.

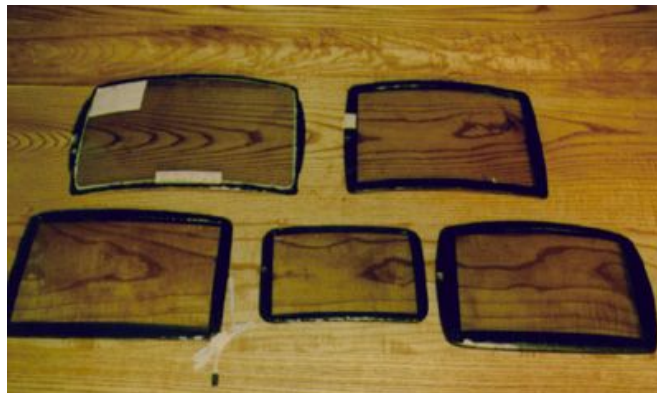
During the time from March, 1971 until December, 1971, 25 units of Model E-100 Elographs were built, and Elographics started a very minor sales campaign. Out of this there were a few sales to end users. The first purchase order for one Elographics Model E-100 measuring system was taken on August 15, 1971 for delivery on November 30, 1971 to Massachusetts Institute of Technology for \$995.00. Talk about extended lead-time!

There were new product releases in three of the trade journals, namely Electronic Design on November 28, 1971, Industrial Research in December, 1971, and Instrument and Apparatus News in December, 1971. The announcements created a lot of inquiries from around the world. Also, many of the science disciplines were represented in inquiries. Out of this activity, one OEM account was established which looked very good for Elographics. It also became apparent that we needed some effort directed toward the marketing of our products. A sales engineer was employed full-time January 17, 1972. A secretary and general manager were added February, 1972. All R&D was carried on by the founders. In 1973 Elo won the I-100 award for having one of the one hundred most significant new technical products of the year.



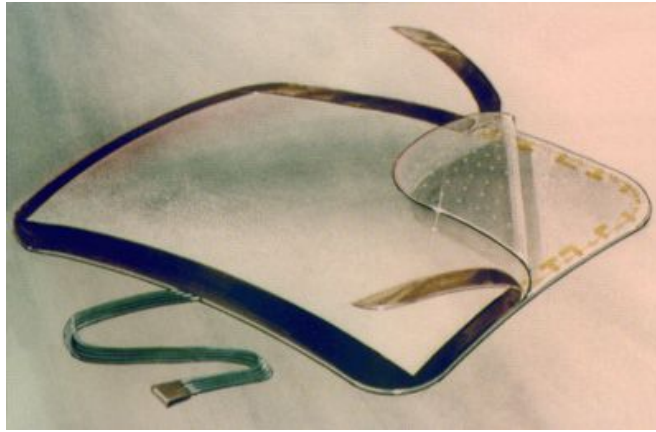
When the company first began, products were manufactured in three basements. One basement was used as the woodworking shop, one built electronic components, and one other for assembly, while a bedroom was used as an office. The first units constructed were very labor intensive and the company produced 25 E-100's in the first nine months of production. In February of 1972, the company moved into its first quarters which was located at 1976 Oak Ridge Turnpike. During 1972, the number of Elographics' employees fluctuated between seven and twelve.

In 1977 a full time president, Bill Gibson, was hired. Bill was excellent at getting start-up companies going. Those of us who worked with Bill remember his motto of "wood is good". From then on things seemed to look up for the company. Soon after Bill Gibson joined Elographics, Siemens Corporation came to us and offered to back Elo in the development of a curved glass sensor, which later was called a touchscreen, as it was activated by touch.



The first AccuTouch products were very labor intensive and only a few were produced each day.

During this time Bill Colwell (one of the founders), and Dr. Hurst spent many long nights and weekends in the Colwell's basement trying to improve the products and technology. This resulted in one of the company's most important patents for the separator dot. This new transparent technology later was named AccuTouch.



*Second generation AccuTouch touchscreen with the proprietary "T pattern" for linearization, eliminating hand-soldered diodes around the edge*

As new employees were hired, space became a problem. In late Fall of 1982, the first computer system was installed in the company. In May of 1983, the company moved to its Grove Center location and began expanding.

In 1982 Elographics displayed 33 televisions covered with the new transparent touch-sensitive panels in the US Pavilion at the 1982 World's Fair in Knoxville, Tennessee. For many people this was the first opportunity to see or use a touchscreen!

In December of 1984 Elographics was honored as the 149th of Inc. Magazine's 500's fastest growing privately-held companies.

During 1985/1986 what was thought to be a small service (monitor integration) was also offered to customers. This business has since developed into an important part of our company.

In January of 1986, Elographics was acquired by Raychem Corporation and became a wholly owned subsidiary.

By October of 1986 the company had outgrown the building at 105 Randolph Road and began renting space across the street. As the company continued to grow, one complete strip of what is known as Grove Center was occupied by Elographics. By 1994 the company housed three building locations in the Grove Center area.

In early 1987, two new technologies were purchased. The surface acoustic wave product, named IntelliTouch, was purchased from Zenith. Early in 1988, a production facility was established in California to manufacture and sell this product. The other technology was purchased from Kennedy Technology. This product was a four-wire resistive technology and was subsequently named DuraTouch. This product line has since been phased out.

1991 became a year of excitement and change. Elographics started on the path to a Total Quality Management philosophy. Process improvements and team activities took over the company. Through empowerment, education and the continuous improvement philosophy, the company started its journey to becoming World Class. Both AccuTouch and IntelliTouch products experienced numerous process improvements, better yields and lower costs.

1992 brought opportunities for sharing the company's successes. Elographics participated as guest speakers in a Quality Leadership Symposium, to share success stories using advanced statistical methods (design of experiments). But continuous improvement never stopped and by Fall of 1992, Elographics announced its initial action plan to become ISO (international Standards Organization) 9001 certified.

On February 24, 1994, the company officially changed its name from Elographics to Elo TouchSystems. This allowed Elo to keep the well deserved reputation it had built by keeping Elo as part of the name and the addition of Touch brought name association with touch products. In August, 1994 Elo TouchSystems achieved ISO 9001 Certification, which provided a level of controlled documentation that helped measure control of our processes. Continuous improvement and team activities were on going. The company has continued on the path to World Class by providing more & more jobs and delighting our customers. The company currently has numerous proprietary designs.

In March of 1995 Elo TouchSystems acquired IQ2000 Automation GmbH, a value-added touchscreen integrator and distributor located near Munich, Germany. In July the company was renamed Elo TouchSystems GmbH. Elo TouchSystems also introduced the longest touchscreen warranties in the industry.

In 1996, Elo announced plans to consolidate its Oak Ridge, Tennessee, and Fremont, California facilities in the Bay Area to facilitate company growth and a closer relationship with Raychem Corporation, Elo's parent company. During this time of transition, Elo's Oak Ridge employees spent hundreds of hours training their successors while continuing improvement techniques, team activity and a level of camaraderie unmatched by any other company.

## **My Eighteen Years with Elographics**

*by Betty Colwell*

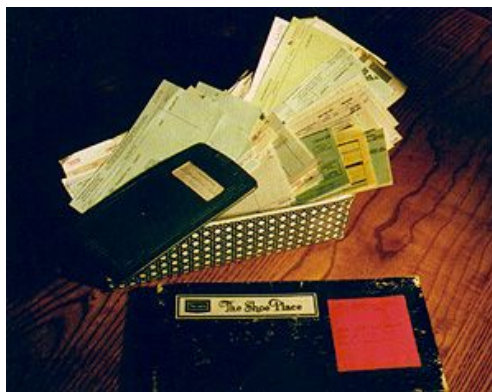


*Betty Lou Colwell will be remembered as the mother of Elographics. Betty Lou and her husband Bill were two of the original founders and employees of Elo. Betty Lou kept all the company receipts at her home in the now famous shoebox. Betty Lou and Bill were instrumental in the startup and growth of Elographics. The following is an article she wrote for Elo in 1989 sharing her history of the company with all the employees.*

First let me say I'm not a writer, but I was asked to do an article on what it has been like to be with Elographics for eighteen years. Eighteen years! I guess when you have a personal interest in something and want to see it succeed, you don't think about time. Most of it has gone fairly fast, but some of it I'd rather not think about for too long. Early in 1971, my husband, Bill, came home from work one evening and told me our friend, Sam Hurst, wanted to start a new company and needed Bill's expertise in graphic arts to help him with a new invention. They both worked at ORNL (Oak Ridge National Laboratory), but Sam had been on leave at the University of Kentucky for two years and while there his graduate students had generated much data that needed to be converted from graphic to digital. Since the only way to do that was manually, it would have taken hundreds of hours which they didn't have as Sam's leave was almost over. He and one of his graduate students put together a crude device that would do this conversion and they called it a digitizer.

Well, who ever heard of a digitizer? Not only did we have to take that crude device and make it into a saleable item, but we had to educate the public and convince them they needed one, all at the same time!

At the incorporation meeting in March of that same year, Sam had gathered together nine friends (physicists, chemists, engineers, draftsmen, administrators, and carpenters) who would contribute their services in their own fields of expertise to save us money. Happily, most of us knew each other already, having worked at the same plant (X-10) for a number of years. Also present at that meeting were Betty Hurst (Sam's wife, who was to be Treasurer) and myself, to take notes. If I had had any inkling of how rough the next few years would be, I might not have accepted when they asked me if I would work full time.



*Elo's first filing system was the famous shoebox.*

Elographics truly began as a basement business: one basement was used for the electronics when the engineers did their thing, one for building the cabinets (walnut, no less), built by a chemist who did woodworking as a hobby, and ours, where the sensors were developed and manufactured. It didn't take long for our family room to fill up with tables, lights, paper, (the original sensor was pierced), measuring devices, X-acto knives, pens and pencils, rubber cement, drawing boards, and more "stuff" such as that. It seemed to me, too, that there was a never-ending layer of scraps waiting to be picked up from the floor. Bill and Sam worked nearly every evening, so Betty and I decided if we were ever going to see our husbands, we would have to go downstairs and join them. Sometimes we actually tried to help; other times we would sit by the fire and visit. Those times were always very pleasant.

It takes a lot to get a company started-time, effort, and MONEY, MONEY, AND MORE MONEY. Our Petty Cash was just that-petty! Our checkbook wasn't much better. Betty would come on Fridays with the checkbook and shoebox filled with invoices and together

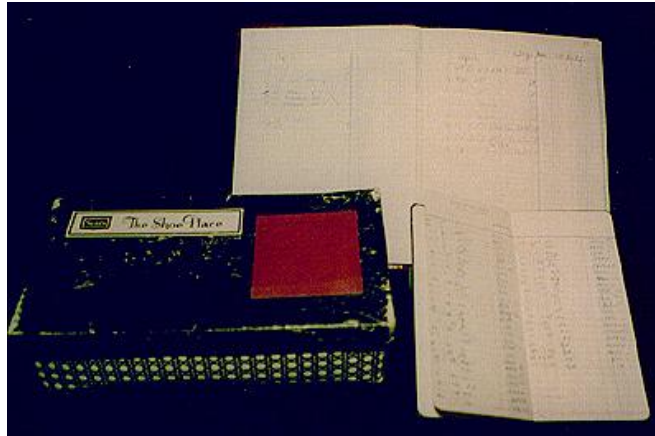


we would agonize over who should get paid in full, who could wait a little longer, and plan. Our stockholders (bless them!) kept buying stock to give us operating money. We still have that old shoebox around here somewhere-for posterity. We still laugh about it too.

BANK OF OAK RIDGE OAK RIDGE, TENNESSEE		In Account with	
MAR 2 1971	SYN. 20.	1000 -	
MAR 7 1971		2000 -	
JUL 2 1971		1000 -	
JUL 2 1971		200 -	
JUL 2 1971		80 -	
DEC 2 1971	mg	1462.35	
JAN 2 1972		1000 -	
JAN 2 1972		1000 -	
FEB 2 1972		5320 -	
FEB 2 1972		1200 -	
FEB 2 1972		1800 -	
MAR 2 1972		4849.56	
MAR 2 1972		2185 -	
MAR 2 1972		155 -	
APR 2 1972		5122 -	
APR 2 1972		1200 -	
APR 2 1972		5320 -	
MAY 2 1972		1000 -	
MAY 2 1972		5000 -	
JUN 2 1972		4998.29	
JUL 2 1972		1722.29	
JUL 2 1972		1795 -	
JUL 2 1972		183.10	
AUG 2 1972		203.12	
SEP 2 1972		1416.70	

Elographics' bank book May 2, 1973, showing a balance of \$10

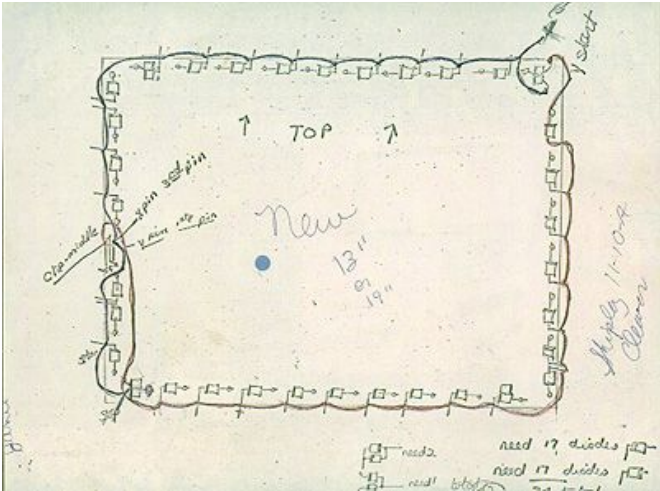
That first year, the office was in my home-the kitchen, our bedroom, anywhere there was available space. I remember hurrying to get my breakfast dishes done, the beds made, the bathrooms cleaned, and myself ready for work, all before 8:30 a.m. The Sales Engineer (a real doll) usually made his calls from the bedroom phone as it was much quieter there than in the kitchen where I was typing. The General Manager (a very funny man) was usually going back and forth. We were so busy that lunchtime was mostly spent there in the kitchen with a bowl of soup and a sandwich.



April 11, 1982 final production book stating a new production goal-"Try for 10 daily"

After we opened our first office in Four Oaks Shopping Center in February of 1972, there was still a tremendous amount of time spent in the basements (nights and weekends) as the sensors and cabinets were still made there and carried to the office for putting together for shipment. As we could afford it, we would add another person at Four Oaks, but for several years we fluctuated between maybe 7 and 12 people. During the time between 1971 and 1977, we had four different Presidents, two of whom ran the company by remote control. They both worked at the plant, so could not devote full time to the job. Finally, in January of 1977, we were able to hire Bill Gibson, who not only knew what to do to get the company off the ground, but how to do it. He had already been through the process once (Tennecomp). It was Bill who made the deal with Siemens, who would back us in the development of a curved glass sensor.

From then on, things seemed to look up. For the first time I felt the company would make it. It was so long in coming but at last we were not only selling a better product-we were actually making money! It wasn't overnight-it took time to make the dot pattern out of the right material for the new product to work the way they wanted. Bill (Colwell) and Sam spent many more nights and weekends in our basement trying this and that material, patiently waiting for it to cure and then measuring each dot to make sure it was exactly the right diameter and height and the spacing was right. I'm glad they did, as it resulted in the technology that so many of our competitors have tried to "borrow".



Early AccuTouch drawing

The Board was a very dedicated and interesting group of fellows. Some of them served the entire time from incorporation until the company was sold. I had the privilege (?) of attending the Board Meetings and many times they would last from 7:30 p.m. until early morning (1:30-2:30 a.m.). Working with that group of really neat people was very enjoyable for me, though. Our stockholders were wonderful, too. If they had given up on us, we would never have lasted.

By the time we moved to Grove Center (1983, I think), we had quite a few people. We had acquired our first computer in the late fall before we moved to Randolph Road in May. Our part-time bookkeeper and I would go home after work, eat a bite, and then come back to learn to use the computer. I was learning payroll and she was learning bookkeeping. It was both fun and frustrating as there were still bugs in the system, but what a relief! It was getting a bit much doing payroll by hand as we were really growing by that time. We hired our first full-time bookkeeper shortly before we moved.

So many improvements have been made in our products over the years it's not hard to believe that we are the leader in touchscreens. We must be doing something right! I was always so proud when we were asked to be part of a World's Fair Expo, as we were so much smaller and not so well known as most companies who took part. I'm also proud that we have so many good people working here who care enough to do their very best. That's the surest way to stay on top!

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